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# Attachment and Personality Disorders Among Child Molesters: The Role of Trust

Sexual Abuse

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## Abstract

The present study investigated multivariate associations between attachment styles and personality disorders (PDs)—and the mediating role of trust—in a sample of child molesters ( $n = 84$ ) and a matched control group from the general community ( $n = 80$ ). Among child molesters, canonical correlation analysis revealed that two variates resembling avoidant and anxious attachment dimensions were associated with PD traits. Attachment avoidance was related to schizoid, schizotypal, and avoidant PDs, with a marginal contribution of antisocial PD. Attachment anxiety was related to borderline and histrionic PDs, with a marginal contribution of obsessive-compulsive PD. Paranoid and dependent PDs contributed to both variates. In the control group, a more general association between attachment insecurity and PDs emerged. Finally, mistrust significantly explained the associations between attachment and PDs in both samples. Future studies should examine whether treatment for PDs in child molesters could benefit from a focus on attachment and trust.

## Keywords

attachment, personality disorders, trust, canonical correlation analysis, child molestation

Personality disorders (PDs) represent a serious challenge for clinicians (Stone, 2006). Notably, PDs are very common in forensic psychiatry (Fazel & Danesh, 2002). In the context of sexual offending, a growing body of research indicates that child molesters often present one or more PDs (Ahlmeier, Kleinsasser, Stoner, & Retzlaff, 2003;

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Bogaerts, Vervaeke, & Goethals, 2004; Craig, Browne, Beech, & Stringer, 2006; Marshall & Marshall, 2000; Sijtsema, Baan, & Bogaerts, 2014). Therefore, understanding possible psychological mechanisms underlying PDs is an important research endeavor that might help refine theories and tailor treatment programs. Attachment theory is an influential framework that has been applied to understand the development and manifestation of PDs (Ainsworth & Bowlby, 1991; Bowlby, 1988; Levy, Johnson, Clouthier, Scala, & Temes, 2015). Of note, an attachment framework has been proposed to understand sexual offending (Marshall, 1993; Marshall & Marshall, 2000), and recently expanded to explain sexual offending among individuals with PDs (Beech & Mitchell, 2009; Mitchell & Beech, 2011). Moreover, in the last three decades, several studies have shown that child molestation and sexual offenses in general are related to a disturbed attachment style (Bogaerts, Declercq, Vanheule, & Palmans, 2005; Bogaerts, Vanheule, & Declercq, 2005; Bogaerts, Vanheule, & Desmet, 2006; Marshall, 1993; Miner, Swinburne Romine, Robinson, Berg, & Knight, 2016; Smallbone & Dadds, 1998; Ward, Hudson, Marshall, & Siegert, 1995).

Recent developments in the field of attachment theory have proposed that a lack of trust can function as mechanism explaining the link between insecure attachment and PDs (Fonagy, Luyten, & Allison, 2015). According to this framework, negative experiences in the context of early attachment relationships can contribute to a limited capacity to trust significant others and the outside world. In turn, this may give rise to problems with self-control and interpersonal relationships, which form the core of PDs (Bo, Sharp, Fonagy, & Kongerslev, 2017; Fonagy & Allison, 2014; Fonagy et al., 2015). Although trust is intimately linked with attachment, such that it can be considered a fundamental component of attachment security, little is known about the possibility that trust could also explain the association between attachment disturbances and PDs. In the present study, we examined the multivariate associations between attachment styles (i.e., secure, avoidant, and anxious) and PDs, as well as the possible mediating role of mistrust in a sample of child molesters, compared with a matched sample of community-dwelling individuals.

## Attachment and PDs

The main tenet of attachment theory is that early interactions with caregivers shape the development of personality throughout life (Ainsworth & Bowlby, 1991). The basic foundation of attachment theory lies on four pillars that describe early relationships between children and their caregivers. The first pillar is the function of *secure base*, which allows the child to explore the environment and to engage in social behavior. The second one is the function of *safe haven*, that is, the child's perception that he or she can rely on the caregiver as a "safe place" to rely on when distressed. The third pillar concerns the *efforts to maintain proximity* employed by the children to remain close to the caregiver while experiencing autonomy. The last pillar regards the *reactions to separation and reunification* with the caregivers (Ainsworth & Bowlby, 1991; Bowlby, 1988). Repeated experiences in these domains generate a system of thoughts, memories, beliefs, expectations, behaviors, and related emotions about the self, the others, and self-other relationships, known as internal working models (Bowlby, 1988).

These internal working models shape the development of attachment styles in terms of feelings of security or insecurity toward attachment relationships and related behavior. Secure attachment is defined by a fundamental belief that primary caregivers are available and trustworthy, which makes it possible to safely explore the environment and to seek love and affection returning to the *secure base* which is eventually internalized (Ainsworth & Bowlby, 1991; Bowlby, 1988). Insecure attachment is typically distinguished in anxious (also referred to as ambivalent, or preoccupied) and avoidant (also referred to as dismissing) styles. Anxious attachment is defined by a belief that significant others are available but their responses are inconsistent and unpredictable. As such, attachment anxiety is characterized by an intense longing for intimacy accompanied by concerns about reliability and availability of others (i.e., “I can’t live without significant others”) and about rejection (i.e., “Significant other will always reject me”). These fears can either be attributed to the fact that others are unreliable, or to the fact that love and affection are not deserved by the self (Bartholomew & Horowitz, 1991; Ren, Arriaga, & Mahan, 2017). Finally, attachment avoidance is characterized by a devaluation of attachment bonds and intimate relationships, based on internal working models representing the others as unavailable and the self as not needing support from others (Ainsworth & Bowlby, 1991; Bowlby, 1988; Ren et al., 2017).

Despite the importance of attachment in the development of psychopathology and violent offending, it has been argued that attachment disturbances may have a primary etiological role in the development and maintenance of sexual offending (Beech & Mitchell, 2009; Marshall, 1993; Marshall & Marshall, 2000; Ward et al., 1995). Different theories (for a review, see Seto, 2008) have described early disturbances in parent–child attachment relationships as one of the first step leading to an increased likelihood to sexually offend later in the development. For instance, Marshall and collaborators have argued that poor parent–child attachments is an essential stage in the development of deviant sexual disposition, creating the basis for social isolation and undermining the capacity for intimacy (Marshall, 1993; Marshall & Marshall, 2000). Ward and collaborators have expanded this framework in their integrated theory of sexual offending (Ward & Beech, 2006; Ward et al., 1995) arguing that attachment-related intimacy deficits may take different forms. Specifically, attachment avoidance is associated with an incapacity to connect emotionally with others and to appreciate the emotional components of sexual behavior (i.e., objectifying others). Conversely, attachment anxiety is related with emotional neediness and concerns about the personal capacity to elicit love and affection from others. In turn, these factors can increase the risk of sexual offending (Ward & Beech, 2006; Ward et al., 1995; Ward & Siegert, 2002).

In line with these theories, some research has corroborated the predictive role of attachment insecurities on coercive sexual behavior, which remained significant after controlling for aggression and general antisociality (Smallbone & Dadds, 2000). If attachment problems have been described as implicated in the etiological pathways leading to sexual offending, they may also contribute to increased level of other known etiological risk factors for sexual offending, such as emotional and self-regulation (Stinson, Becker, & Sales, 2008; Stinson, Sales, & Becker, 2008; Ward & Beech,

2006; Ward, Hudson, & Keenan, 1998). Indeed, attachment theory and empirical research have shown that self-regulation abilities are initially acquired through the internalization of parent–child interactions early in the development (Calkins, 2004; Sroufe, 1996; Tronick, 2007). As such, the importance of studying attachment in sex offenders seems widely recognized, and in recent years some authors have argued that attachment problems may specifically be relevant to understand the personality dysfunctions that characterize sex offenders (Beech & Mitchell, 2009). Of note, the relevance of understanding the factors underlying PDs in sex offenders is emphasized by studies indicating that sex offenders with PDs are more likely to present with complex forms of psychopathology, increased risk, and greater likelihood of treatment dropout (Stinson, 2016; Stinson & Becker, 2011).

With specific regard to PDs, numerous studies have documented that attachment insecurity represents a risk factor for the development of pathological personality traits (Bakermans-Kranenburg & van IJzendoorn, 2009; Bartholomew, Kwong, & Hart, 2001; Beech & Mitchell, 2009; Fossati et al., 2015; Levy et al., 2015). However, most prior studies have mainly provided support for a generic—rather than specific—role of attachment disturbances in contributing to PDs in general (Bakermans-Kranenburg & van IJzendoorn, 2009; Levy et al., 2015). That is, there seems to be little consensus as to whether specific attachment styles (e.g., avoidant, anxious) are selectively related to specific PDs. Among the few exceptions, research has shown that borderline PD is strongly linked to an anxious attachment style (Agrawal, Gunderson, Holmes, & Lyons-Ruth, 2004; Bakermans-Kranenburg & van IJzendoorn, 2009; Barone, Fossati, & Guiducci, 2011; Beeney et al., 2015).<sup>1</sup> Other studies have found associations between attachment insecurities and schizotypal (Goodall, Rush, Grunwald, Darling, & Tiliopoulos, 2015), obsessive-compulsive (Wiltgen et al., 2015), avoidant, and antisocial PDs (Beeney et al., 2015; McGauley, Yakeley, Williams, & Bateman, 2011; Yakeley & Williams, 2014). More generally, recent reviews and meta-analytic studies have suggested that borderline, histrionic, and dependent PDs are more tightly linked to anxious attachment. Conversely, paranoid, schizotypal, and antisocial PDs are more often associated with avoidant attachment (Bakermans-Kranenburg & van IJzendoorn, 2009; Levy et al., 2015).

Although prior studies have greatly advanced our understanding of the connections between attachment and PDs, one important limitation of these studies is that they have mainly looked at the bivariate association between attachment styles and PDs or at the presence of PD diagnoses in correspondence to attachment categories. However, research on PDs and attachment indicates that a multivariate approach is preferable as it allows to take into account the substantial degree of overlap between PDs and between attachment dimensions when examining relations between PDs and attachment styles (Brennan, Clark, & Shaver, 1998; Brennan & Shaver, 1995, 1998; Fossati et al., 2003; Sherry, Lyddon, & Henson, 2007). It is plausible that rather than bivariate relations between single PDs and single attachment styles, associations exist between *constellations* of PD traits and *constellations* of attachment dimensions (Fossati et al., 2003). Indeed, rather than being distinct categories, attachment styles and PD traits are more aptly conceptualized as

dimensions that can overlap to a certain extent (Brennan & Shaver, 1998; Lenzenweger, 2008). This approach is also consistent with the newly developed alternative model of PDs reported in Section III of the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM-5*; American Psychiatric Association [APA], 2013), which defines PDs based on the presence and severity of maladaptive personality traits, thus allowing for the overlap between traits that were thought to underlie different PD categories as described in the traditional polythetic approach.

To our knowledge, only three studies have examined associations between attachment dimensions and PDs using a multivariate approach such as canonical correlation analysis (CCA). In these studies, results revealed that two sets of canonical variates (akin to latent factors) explained the association between attachment styles and PDs (Brennan & Shaver, 1998; Fossati et al., 2003; Sherry et al., 2007). Two of these studies adopted a four-way conceptualization of attachment that distinguished fearful, preoccupied, dismissing, and secure attachment styles (Brennan & Shaver, 1998; Sherry et al., 2007). In nonclinical (i.e., community and college students) samples, these studies reported that two canonical variates were able to explain a substantial portion of variance in traits of almost all PDs. The first canonical variate in both studies indicated that fearful and preoccupied attachment were related to paranoid, schizotypal, avoidant, and borderline PD (Brennan & Shaver, 1998; Sherry et al., 2007), as well as with narcissistic and obsessive-compulsive PD in one study only (Brennan & Shaver, 1998). The second variate revealed that schizoid PD traits were associated with dismissing attachment (Brennan & Shaver, 1998; Sherry et al., 2007). Of note, in Brennan and Shaver's (1998) study, dismissing attachment also had a marginal contribution on the first canonical variate, making results more difficult to interpret.

Fossati et al. (2003) replicated and extended these results in a mixed psychiatric sample. In that study, two sets of canonical variates explained the variance shared by attachment dimensions and PDs. In line with factor analytic studies on attachment scales (Brennan et al., 1998), Fossati et al. (2003) concluded that the two attachment variates closely resembled the avoidance and anxiety attachment dimensions. Their findings indicated more specific associations compared with the studies reviewed above. Attachment avoidance was mainly related to a constellation of avoidant, depressive, paranoid, and schizotypal PD traits. Conversely, attachment anxiety was linked with a constellation of dependent, histrionic, and borderline PD traits. It is possible that results were less differentiated in Brennan and Shaver's (1998) and Sherry et al.'s (2007) studies as the variability of PD traits and attachment styles is likely restricted in relatively well-adjusted (i.e., community or college) samples, compared with clinical samples. Despite similarities (e.g., that two attachment variates explain substantial variance in PD traits) and differences (e.g., specific or general associations between attachment insecurities and PDs), these two studies have contributed to the understanding of the interconnections between attachment styles and PD traits. Overall, there seems to be consistent evidence that attachment styles contribute to PDs across different populations, although it is plausible that also other factors contribute to the development and maintenance of PDs.

## **The Role of Mistrust in Linking Attachment Insecurities and PDs**

A next step to gain theoretical and clinical knowledge in relation to an attachment framework for personality pathology is to examine possible mediators of the relation between attachment insecurities and PDs. In line with a developmental psychopathology framework, the legacy of early attachment relationships on personality development later in life could involve several paths. That is, mechanisms linking attachment and personality traits may involve emotion regulation, behavioral regulation, and social cognition (Beeney et al., 2015; Weinfield, Sroufe, Egeland, & Carlson, 2008). Recent developments in attachment theory have emphasized that early attachment relationships play a crucial role in allowing children to develop a sense of epistemic trust, that is, genuine feelings of trust in the authenticity of knowledge transmitted in interpersonal encounters (Fonagy & Allison, 2014; Fonagy et al., 2015). This conceptualization has direct relevance for personality pathology. Indeed, Fonagy et al. (2015) have proposed that vulnerability to PDs is related to a pervasive lack of trust originated in inadequate experiences with early attachment figures. A condition of mistrust represents a risk factor for psychopathology as it could hinder the transmission of emotional and cognitive knowledge. In the absence of such knowledge, individuals are constantly confronted with doubts about what and whom to believe, and some will in turn develop maladaptive ways to navigate the social world (Bo et al., 2017; Fonagy & Allison, 2014; Fonagy et al., 2015). Inadequate or traumatic experiences early in the development can contribute to a generalized sense of mistrust that makes individuals interpret the outside world as always untrustworthy and threatening. Of note, this has clear relevance to the treatment of offenders and forensic patients, as the tendency to perceive the world as menacing and respond with hostility is often related to violent offenses (Garofalo, Holden, Zeigler-Hill, & Velotti, 2016; Nestor, 2002).

In the context of child sexual abuse, it has been argued that insecure attachment may lead to an inability to develop feelings of trust and a sense of personal safety, which are considered part of the intimacy and social skills deficits linked with child sexual abuse (Ward & Siebert, 2002). However, this perspective is not meant to suggest that attachment necessarily precedes and alone contributes to individual differences in trust. Although trust is intimately linked with secure attachment, it should be emphasized that, in the context of attachment theory, the issue of trust has historically been discussed as it pertains to the parent–child relationship. However, less empirical research has been conducted to understand whether attachment security (or lack thereof) contributes to individual differences in levels of general trust, as described in theories of PDs (Fonagy & Allison, 2014; Fonagy et al., 2015) and sexual offending (Ward & Siebert, 2002). Despite its theoretical and clinical relevance, the possible role of a lack of trust in explaining associations between attachment disturbances and PDs has yet to be empirically tested, and has never been addressed in forensic psychology and psychiatry.



## The Current Study

In the current study, we aimed at further replicating and extending current knowledge on the developmental roots of PDs in clinical populations by examining the multivariate associations between attachment styles and PD traits in a child molester sample. To increase the validity of the study, child molesters were compared to a community sample matched for sociodemographic characteristics. In light of prior studies (Brennan & Shaver, 1998; Fossati et al., 2003; Sherry et al., 2007), we hypothesized that a clearer pattern of associations—distinguishing between attachment anxiety and avoidance—would characterize relations between attachment and PDs in the child molester sample. Conversely, in the control sample it was expected a more general association between attachment insecurities and PD traits, without specific associations between certain attachment styles and selected PDs. A multivariate statistical approach was adopted to allow the different PDs to covary, rather than considering them as monolithic categories, in line with the emerging literature on the fluid and dimensional nature of most PDs. Further, we examined whether associations between attachment dimensions and PD traits could be accounted for by levels of mistrust. Of note, as the extent of pedophilic interests has been found to distinguish between subgroups of child molesters, we examine whether levels of pedophilic interest had an influence on the main study aims.

## Method

### *Participants and Procedures*

All participants were recruited in Belgium, after receiving ethical clearance from the relevant Institutional Review Board. The child molester sample consisted of 84 participants recruited from either an educational community-based training program (provided as an alternative sanction;  $n = 51$ ) or from a prison ( $n = 33$ ). All child molesters had committed at least one sexual offense against a victim of 16 years of age or less ( $M = 11.58$ ,  $SD = 2.76$ , range = 2-16 years old).<sup>2</sup> Of them, 41 (48.8%) child molesters committed intrafamilial offenses, and 43 (51.2%) committed extrafamilial child molestation. Based on file review, 50 (60%) child molesters had one victim, 17 (20%) had two victims, 10 (12%) had three victims, and 7 (8%) had four or more victims. The nature of the crime involved active penetration of the victim's body in 47 cases (56%) and hands-on offense without active penetration in 37 cases (44%). All child molesters had at least one female child victim, and 22 of them (26%) also had at least one male child victim. Preliminary analyses revealed the absence of substantial differences between different subgroups of child molesters (e.g., incarcerated or not, extra- or intrafamilial offenses, number of victims, with or without a pedophilic disorder),<sup>3</sup> and therefore all child molesters were combined in one sample to maximize statistical power. In terms of demographic characteristics, participants in the child molester sample were all males, with a mean age of 38 years and 5 months ( $SD = 11.1$ ). Further, 32 of them (38%) were married, 33 (40%) single, and 19 (22%) divorced. Finally, 17



(20%) finished only primary school, 25 (30%) finished middle school, 27 (32%) completed high school, and 15 (16%) attended college or university. Based on these demographic characteristics (age, marital status, employment status, and educational level), each participant in the child molester sample was matched with community-dwelling participants from a metropolitan area in the Flemish part of Belgium, using a snowball sample technique. Respondents with the target characteristics (i.e., matched to participants in the child molester sample) volunteered to participate in the study and were invited to indicate additional potential participants to the researcher. Although four child molesters did not have a matched subject in the control group (which therefore consisted of 80 community participants), preliminary analyses revealed no significant group differences in demographic features.

## Measures

*Adult Attachment Scale (AAS).* The Dutch/Flemish version of the AAS (Hazan & Shaver, 1987) was used as a measure of adult attachment style. The AAS is a self-report instrument that comprises two sections. In the first section, respondents have to read three descriptions of attachment styles (secure, avoidant, and anxious) and indicate which one resemble their own style, yielding a categorical score. The second section includes three items rated on a 7-point Likert scale to measure the extent to which participants recognize themselves in each description, yielding dimensional scores of secure, avoidant, and anxious attachment. Both the original version (Crowell, Fraley, & Shaver, 2008; Hazan & Shaver, 1987) and the Dutch adaptation (Verschuere & Marcoen, 1993) of the AAS have demonstrated adequate psychometric properties.

*Modified Erikson Psychosocial Stage Inventory (MEPSI).* The 10-item Trust/Mistrust subscale of the MEPSI (Darling-Fisher & Leidy, 1988) was used as a proxy measure of trust. Items are rated on a 5-point Likert scale and are either positively (e.g., “Other people understand me”) or negatively worded (e.g., “People try to take advantage of me”). An overall score is computed averaging item scores such that higher scores indicate greater levels of trust. The Dutch/Flemish version of the MEPSI has demonstrated adequate psychometric properties (Verschuere & Marcoen, 1993). In the present study, internal consistency of the Trust scale was acceptable ( $\alpha = .79$ ).

*Assessment of DSM-IV PDs (ADP-IV).* Dimensional scores of PDs were obtained using the ADP-IV (Schotte, de Doncker, Vankerckhoven, Vertommen, & Cosyns, 1998). Although the ADP-IV was developed to assess PDs listed in the previous version of the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; *DSM-IV-TR*; APA, 2000), all PDs and corresponding criteria remained unaltered in the current version of the *DSM* (*DSM-5*; APA, 2013). The ADP-IV is a self-report questionnaire, which consists of 94 items rated on a 7-point Likert scale. These 94 items correspond to the diagnostic criteria of each PD. For the purpose of the present study, the 10 PDs included in the *DSM-IV* and *DSM-5* PD sections were used, that is, paranoid, schizoid,

schizotypal, histrionic, borderline, narcissistic, antisocial, avoidant, dependent, and obsessive-compulsive PD. The psychometric properties of the Dutch version of the ADP-IV were satisfactory (Schotte & De Doncker, 2000). In the present study, internal consistency coefficients were all above .70, with the exception of the schizoid ( $\alpha = .60$ ) and the obsessive-compulsive ( $\alpha = .68$ ) PD scales.

*Screening Scale for Pedophilic Interests (SSPI).* The SSPI (Seto & Lalumiere, 2001) is a clinician-rated measure to assess sexual interest in children among child molesters (i.e., those who have committed a sexual offense with a victim of less than 14 years of age). The SSPI consists of four items regarding the characteristics of the victims of previously committed sexual offenses, and specifically male victim, unknown victim, more than two victims, victim age of 11 years old or younger. These items were chosen as they appear to be strongly linked to sexual interest toward children, therefore providing a brief proxy measure when more specific indices are not available (e.g., phallometry). All items are scored dichotomously, with 0 if the characteristic is absent and 1 if the characteristic is present. The item about male child victim is weighted 2 if present, as it has demonstrated a relatively stronger association with sexual arousal toward children as assessed with phallometry. Therefore, the total score of the SSPI can range between 0 and 5. Previous research has supported the construct, predictive, and incremental validity of the SSPI (Helmus, Ciardha, & Seto, 2015).

### *Data Analytic Strategy*

After descriptive statistics were computed, group comparisons between the child molester and the community sample on all study variables were tested with univariate and multivariate analyses of variance (ANOVA and MANOVA). Pearson product-moment correlations were calculated to examine bivariate associations among all study variables. To examine the multivariate associations between attachment styles and PDs, a CCA was conducted using the three attachment styles (i.e., secure, avoidant, anxious) as predictors, and the 10 PDs included in the *DSM-5* (APA, 2013) taxonomy as criteria. CCA produces pairs of synthetic (i.e., latent) functions (also known as variates) to examine the portion of variance that is shared between the two sets of interrelated variables (indexed by the canonical correlation coefficient). The first pair of functions is created to maximize the correlation between the two sets. The second pair of functions, and all subsequent pairs, are created again to maximize the correlations between the two sets, but are constrained to be orthogonal to the functions in the previous pair. Further, CCA allows researchers to evaluate which variables in each set contribute more strongly to the shared variance between the two sets. Specifically, structure coefficients ( $r_s$ ) represent a measure of the magnitude of the association (i.e., effect size) between one variable and the synthetic function generated by the composite set of variables. Because the  $r_s$  produced in CCA reflect the structure coefficients used in factor analysis, we adopted the conventional rule of thumb to consider as meaningful effect sizes those equal to or greater than .45 in absolute value. However, less conservative cut-offs have been proposed, indicating that  $r_s$  above .30 can also be

interpretable (Comrey & Lee, 1992; Tabachnick & Fidell, 2013). This is particularly the case in the presence of homogeneity of scores in the sample—that is, when a sample produces similar scores on observed variables (Tabachnick & Fidell, 2013). For increased reliability, CCA requires a ratio of about 10 cases for each independent variable (Tabachnick & Fidell, 2013). In the current study, the set of independent variables consisted of the three attachment styles, and therefore the sample sizes ( $N \geq 80$ ) ensured adequate statistical power.

Finally, we employed a bootstrapping approach with bias-corrected confidence intervals (CI) to examine the possible mediating role of trust in the relation between attachment and PDs. Bootstrapping is a powerful nonparametric technique that involves random resampling with replacement from the original data set to estimate point estimates, standard errors, and CI in each resample (Hayes, 2013). In the current study, 5000 bootstrap replications and 95% bias-corrected CI were computed to test the significance of the indirect effect of attachment styles on PDs through levels of trust. Point estimates represent the average over the number of bootstrapped samples, and CI that do not include zero allow to confidently conclude that the indirect effect is significant.

## Results

### *Descriptive Analyses, Group Comparison, and Zero-Order Correlations*

Descriptive statistics and group comparisons are presented in Table 1. Within groups, mean scores within each set of variables were rather homogeneous, justifying the use of less conservative cut-offs in interpreting CCA results. The child molester group reported significantly lower levels of secure attachment (though the multivariate effect was only marginally significant,  $p = .05$ ). Child molester also reported significantly higher scores on all PDs, with exception of obsessive-compulsive PD. Regarding attachment style categories, there was a significant difference in the distribution of secure, avoidant, and anxious attachment styles between the two groups,  $\chi^2(2) = 9.70, p < .01$  (secure attachment:  $N_{\text{child molesters}} = 39, N_{\text{control}} = 54$ ; avoidant attachment:  $N_{\text{child molesters}} = 26, N_{\text{control}} = 10$ ; anxious attachment  $N_{\text{child molesters}} = 19, N_{\text{control}} = 16$ ). Specifically, child molesters had a significantly lower prevalence of secure attachment and a significantly higher prevalence of avoidant attachment,  $\chi^2(1) = 7.44$ , and  $\chi^2(1) = 8.14$ , respectively, all  $ps < .01$ . No significant differences occurred regarding the prevalence of ambivalent attachment style.

Zero-order correlations among study variables in both samples are displayed in Table 2. In both samples, a clear trend highlighted that attachment security was negatively related, and both attachment avoidance and anxiety positively related, to positive association linked trust and attachment security.<sup>4</sup> Of note, intercorrelations among PDs as well as among attachment styles were significant and uniformly distributed across all variables in both samples. With the partial exception of associations involving schizoid PD, intercorrelations among PDs fell in the moderate-to-large range of effect size in the vast majority of cases. Likewise, significant correlations in the

**Table 1.** Mean, Standard Deviation, and Group Differences on All Study Variables, Comparing the Child Molester ( $n = 84$ ) and the Control Group ( $n = 80$ ).

	Child molesters		Control group				
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>F</i>	<i>df</i>	
Attachment styles <sup>a</sup>							
Attachment security	4.73	1.67	5.35	1.42	6.61*	1,162	.04
Attachment avoidance	3.43	1.91	3.15	1.65	1.00	1,162	.01
Attachment anxiety	3.30	2.03	3.40	2.05	.10	1,162	.00
PDs <sup>b</sup>							
Paranoid PD	18.14	6.43	15.28	4.89	10.27**	1,162	.06
Schizoid PD	19.08	5.96	16.15	4.66	12.23**	1,162	.07
Schizotypal PD	22.74	7.63	19.10	7.69	9.84**	1,162	.05
Antisocial PD	15.61	6.08	12.13	3.74	19.28***	1,162	.11
Borderline PD	25.64	9.09	22.83	8.33	4.27*	1,162	.03
Histrionic PD	19.76	6.11	17.18	6.81	6.57*	1,162	.04
Narcissistic PD	19.12	5.59	16.65	4.97	8.90**	1,162	.05
Avoidant PD	19.80	7.98	17.23	5.81	5.52*	1,162	.03
Dependent PD	19.51	6.37	17.03	5.23	7.43**	1,162	.04
Obsessive-compulsive PD	23.18	8.07	21.33	6.72	2.54	1,162	.02
Trust	3.18	.50	3.55	.56	19.43***	1,162	.11
Pedophilic interest	1.77	1.41	—	—	—	—	—

Note. *F* coefficients are based on univariate analysis of variance (ANOVA).  $\eta_p^2$  = partial eta squared, measure of effect size (.01 = small effect; .06 = medium effect; .13 = large effect; Cohen, 1988). PD = personality disorder; MANOVA = multivariate analysis of variance.

<sup>a</sup>One-way MANOVA Wilks's  $\lambda = .95$ ,  $F(3, 160) = 2.66$ ,  $p = .05$ ,  $\eta_p^2 = .05$ .

<sup>b</sup>One-way MANOVA Wilks's  $\lambda = .82$ ,  $F(10, 153) = 3.41$ ,  $p < .001$ ,  $\eta_p^2 = .18$ .

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

expected direction emerged between different attachment styles (i.e., attachment security negatively related to anxiety and avoidance, which in turn were positively related to each other). Taken together, this substantial degree of overlap between each variable set further justified the multivariate approach (i.e., CCA).

## CCA

As CCA produces a number of canonical variates (i.e., functions) equal to the number of variables in the smaller of the two variable sets (here, attachment styles), three pairs of functions were produced with squared canonical correlations ( $R_c^2$ ) of .49, .22, PD traits, though with varying degrees of effect size. Further, trust was inversely related to PD traits, attachment avoidance, and attachment anxiety, while a significant and .17 for each successive pair. The overall model including all functions was statistically significant, Wilks's  $\lambda = .33$ ,  $F(30, 209) = 3.19$ ,  $p < .001$ , indicating that the full model

**Table 2.** Zero-Order Correlations Among All Study Variables in the Child Molester (Below the Diagonal;  $n = 84$ ) and Control (Above the Diagonal;  $n = 80$ ) Samples.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Attachment security	—	-.68***	-.39***	-.69***	-.22	-.43***	-.26*	-.41***	-.20	-.38**	-.42***	-.25*	-.21	.54***	—
2. Attachment avoidance	-.37**	—	.37**	.48***	.16	.31**	-.02	.23*	.08	.20	.33**	.17	.19	-.46***	—
3. Attachment anxiety	-.27*	.42***	—	.48***	.30**	.46***	.28*	.52***	.31**	.21	.52***	.36**	.45***	-.54***	—
4. Paranoid PD	-.29**	.22*	.33**	—	.35**	.59***	.46***	.59***	.43***	.50***	.54***	.43***	.43***	-.50***	—
5. Schizoid PD	-.44***	.52***	.27*	.45***	—	.51***	.22	.25*	.05	.29**	.49***	.44***	.45***	-.25*	—
6. Schizotypal PD	-.36**	.31**	.29**	.69***	.49***	—	.53***	.79***	.54***	.43***	.64***	.62***	.57***	-.55***	—
7. Antisocial PD	-.25*	.21	.21	.52***	.33**	.54***	—	.70***	.60***	.34**	.43***	.44***	.27*	-.45***	—
8. Borderline PD	-.13	.19	.38***	.62***	.41***	.67***	.72***	—	.79***	.53***	.66***	.66***	.60***	-.58***	—
9. Histrionic PD	-.07	.21	.27*	.47***	.14	.52***	.51***	.60***	—	.46***	.43***	.59***	.54***	-.41***	—
10. Narcissistic PD	-.11	.06	.13	.67***	.29**	.62***	.45***	.61***	.54***	—	.52***	.73***	.59***	-.28*	—
11. Avoidant PD	-.43***	.47***	.36**	.43***	.62***	.53***	.41***	.44***	.30**	.29**	—	.77***	.68***	-.34***	—
12. Dependent PD	-.33**	.16	.33**	.53***	.42**	.59***	.53***	.66***	.48***	.55***	.68***	—	.69***	-.42***	—
13. Obsessive-compulsive PD	-.10	.12	.21	.55***	.42**	.47***	.39***	.54***	.41***	.60***	.44***	.63***	—	-.21	—
14. Trust	.30**	-.32**	-.36**	-.40***	-.44***	-.41***	-.38***	-.46***	-.18	-.15	-.38***	-.34**	-.15	—	—
15. Pedophilic interest	-.12	.02	.11	-.03	-.06	.00	.18	.00	.11	-.07	-.03	-.07	-.04	-.02	—

Note. PD = personality disorder.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

explained a substantial portion (i.e., roughly 67%) of the shared variance shared between the two sets of variables. Dimension reduction analysis showed that Functions 2 to 3 were also significant, Wilks's  $\lambda = .65$ ,  $F(18, 144) = 1.93$ ,  $p < .05$ . Conversely, Functions 3 in isolation did not explain a statistically significant amount of variance, Wilks's  $\lambda = .83$ ,  $F(8, 73) = 1.82$ ,  $p > .05$ . Thus, only the first two pairs of functions were retained for further interpretation. A canonical correlation of .70 linked the first pair of functions, indicating large effect size. Therefore, the two variables sets shared roughly 50% of the variance through this pair of functions ( $R_c^2 = .49$ ). The second pair of functions ( $R_c^2 = .22$ ) explained approximately 22% of the residual variance (i.e., after the extraction of the first pair of functions), that is, roughly 11% of total variance. The canonical correlation between the second attachment function and the second PD function revealed moderate effect size ( $R_c = .47$ ).

Table 3 displays standardized canonical function coefficients, structure coefficients ( $r_s$ ), and squared structure coefficients ( $r_s^2$ ) for the first two pairs of functions, as well as the communalities for each variable across all functions. Inspection of  $r_s$  revealed that the attachment styles that demonstrated the largest loadings on the first function were secure and avoidant, with opposite sign and similar magnitude. Based on these loadings, this function bears some resemblance to the avoidant attachment dimension identified in prior studies (i.e., high attachment avoidance and low attachment security). Among the PDs variables, the largest loadings on the first function were reported for schizoid, schizotypal, and avoidant PDs. All coefficients were negative, indicating that these PDs variables were positively related to the avoidant attachment style, and negatively related to the secure attachment style.

Looking at the second pair of functions, the main predictor was anxious attachment, with positive sign. As such, this function bears some resemblance to the anxious attachment dimension reported in prior studies (e.g., Fossati et al., 2003). Borderline and histrionic PDs showed a substantial contribution to this function, again with positive sign. Accordingly, this function appears to highlight an association between borderline and histrionic PD and anxious attachment style. Adopting a less conservative cut-off (i.e.,  $r_s$  greater than 30 in absolute value) to interpret the contribution of PDs to the first two functions, results revealed that antisocial PD contributed exclusively to the first function (i.e., was associated with attachment avoidance). Obsessive-compulsive PD contributed exclusively to the second function (i.e., was associated with attachment anxiety), and both paranoid and dependent PD had a similar contribution to both functions. A graphical depiction of CCA results in the child molester sample (limited to the first two pairs of functions) is presented in Figure 1.

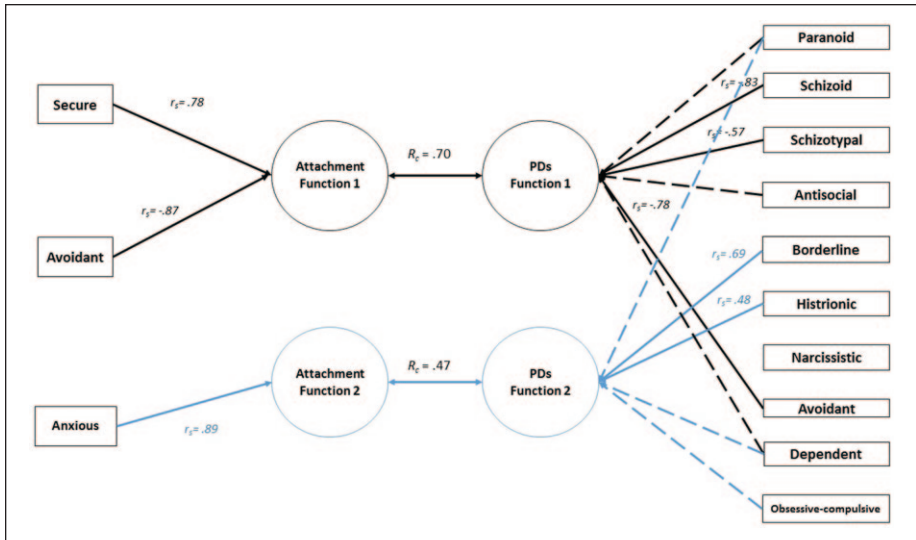
Of note, when we repeated the CCA controlling for levels of pedophilic interest (i.e., SSPI total score), results remained virtually unchanged. The overall model's Wilks's  $\lambda$  was .31,  $F(30, 203) = 3.28$ ,  $p < .001$ . Also Functions 2 to 3 were significant, Wilks's  $\lambda = .61$ ,  $F(18, 140) = 2.15$ ,  $p < .01$ . Finally, Function 3 in isolation was not significant, Wilks's  $\lambda = .82$ ,  $F(8, 71) = 2.00$ ,  $p > .05$ . Table 3 shows the standardized canonical function coefficients and the  $r_s$ . The only changes worth mentioning regarded paranoid and dependent PD (which were more strongly related to the

**Table 3.** Canonical Correlation Analysis of Dimensionally Assessed Attachment Styles and Personality Disorders in the Child Molester Sample ( $n = 84$ ).

Variable	Function 1			Function 2		
	Coef.	$r_s$	$r_s^2$ (%)	Coef.	$r_s$	$r_s^2$ (%)
Personality disorders						
Paranoid	-.12 (-.10)	-.43 (-.41)	18.49	.54 (.79)	.43 (.56)	18.49
Schizoid	-.63 (-.64)	-.83 (-.83)	68.89	-.35 (-.38)	.07 (.07)	0.49
Schizotypal	-.29 (-.30)	-.57 (-.57)	32.49	-.42 (-.29)	.24 (.33)	5.76
Antisocial	-.19 (-.17)	-.39 (-.37)	15.21	-.69 (-.59)	.20 (.25)	4.00
Borderline	.41 (.42)	-.28 (-.26)	7.84	1.33 (.96)	.69 (.65)	47.61
Histrionic	-.22 (-.20)	-.25 (-.22)	6.25	.24 (-.10)	.48 (.33)	23.04
Narcissistic	.20 (.17)	-.14 (-.14)	1.96	-.57 (-.55)	.18 (.24)	3.24
Avoidant	-.43 (-.44)	-.78 (-.78)	60.84	.28 (-.02)	.30 (.32)	9.00
Dependent	.05 (.05)	-.40 (-.40)	16.00	-.04 (.65)	.41 (.63)	16.81
Obsessive-compulsive	.26 (.27)	-.18 (-.18)	3.24	.10 (-.08)	.36 (.37)	12.96
$R_c^2$ (%)			<b>49.04</b> (48.93)		<b>22.17</b> (24.77)	
Attachment style						
Secure	.54 (.54)	.78 (.78)	60.84	.40 (-.09)	.17 (-.15)	2.89
Avoidant	-.67 (-.69)	-.87 (-.87)	75.69	-.16 (-.58)	.14 (-.05)	1.96
Anxious	.01 (.05)	-.42 (-.39)	17.64	1.07 (1.10)	.89 (.87)	79.21
						<b>96.85</b>

Note. Coef. = standardized canonical function coefficient.  $r_s$  = structure coefficients.  $r_s^2$  (%) = squared structure coefficient.  $h^2$  = communality coefficient (rounded).  $r_s$  greater than .45| and  $h^2$  greater than 45% are in italics and bolded.  $r_s$  greater than |.30| and  $h^2$  greater than 30% are in italics. Coefficients in parenthesis refer to partial canonical correlation analysis, controlling for levels of pedophilic interest.





**Figure 1.** Graphical depiction of the first two pairs of functions produced by canonical correlations analysis in the child molester sample.

Note. Each pair of functions represent the latent correlation between the three attachment styles and the 10 personality disorders (PDs). Arrows indicate the contribution of variables in each set to the corresponding synthetic function. For ease of presentation, only structure coefficients ( $r_s$ ) greater than  $|\ .45|$  are reported. Dashed arrows indicate contributions with  $r_s$  greater than  $|\ .30|$ .

second function), as well as histrionic PD (whose contribution to the second function was attenuated).

In the control sample, the overall model including all functions was statistically significant, Wilks's  $\lambda = .25$ ,  $F(30, 197) = 3.93$ ,  $p < .001$ . Dimension reduction analysis showed that Functions 2 to 3 were also significant, Wilks's  $\lambda = .66$ ,  $F(18, 136) = 1.77$ ,  $p < .05$ . Conversely, Functions 3 in isolation was not significant, Wilks's  $\lambda = .87$ ,  $F(8, 69) = 1.23$ ,  $p > .05$ . Therefore, also in this case, only the first two pairs of functions were retained for further interpretation. Table 4 shows results of CCA in the control sample. A canonical correlation of .78 linked the first pair of functions, explaining approximately 61% of the variance. The second pair of functions ( $R_C = .50$ ) explained approximately 25% of the residual variance, that is, roughly 10% of total variance. Inspection of  $r_s$  revealed that high levels of attachment avoidance and anxiety, as well as low levels of attachment security, defined the first function. As such, this function resembled a general dimension of insecure attachment. Notably, all PDs made a substantial contribution to this function (all  $r_s > .30$ ), with seven PDs approaching or exceeding a  $r_s$  of .45. In short, this pair of functions revealed a strong—yet generic—relation between PDs and insecure attachment. Anxious attachment and obsessive-compulsive PD, with additional contribution of borderline, histrionic, avoidant, and dependent PDs, mostly characterized the second pair of functions.

**Table 4.** Canonical Correlation Analysis of Dimensionally Assessed Attachment Styles and Personality Disorders in the Control Sample (*n* = 80).

		Function 1			Function 2			
Variable		Coef.	<i>r<sub>s</sub></i>	<i>r<sub>s</sub><sup>2</sup></i> (%)	Coef.	<i>r<sub>s</sub></i>	<i>r<sub>s</sub><sup>2</sup></i> (%)	<i>h<sup>2</sup></i> (%)
Personality disorders	Paranoid	.72	<b>.93</b>	86.49	.30	.10	0.01	<b>86.50</b>
	Schizoid	.01	.37	13.69	-.20	-.26	6.76	20.45
	Schizotypal	.04	<b>.66</b>	43.56	.61	-.25	6.25	<b>49.81</b>
	Antisocial	-.23	.39	15.21	-.02	-.19	3.61	18.82
	Borderline	.48	<b>.67</b>	44.89	-1.03	-.42	17.74	<b>62.63</b>
	Histrionic	-.17	.36	12.96	.27	-.33	10.89	23.85
	Narcissistic	.10	<b>.47</b>	22.09	1.02	.15	2.25	24.34
	Avoidant	.42	<b>.69</b>	47.61	.16	-.40	16.00	<b>63.61</b>
	Dependent	-.30	.43	18.49	-.54	-.33	10.89	29.38
	Obsessive-compulsive	-.15	.44	19.36	-.81	<b>-.56</b>	31.36	<b>50.72</b>
	<i>R<sub>c</sub><sup>2</sup></i> (%)			<b>61.48</b>			<b>24.94</b>	
Attachment style	Secure	-.73	<b>-.92</b>	84.64	-.73	-.38	14.44	<b>99.08</b>
	Avoidant	.03	<b>.69</b>	47.61	.07	.18	3.24	<b>50.85</b>
	Anxious	.41	<b>.71</b>	50.41	-1.01	<b>-.70</b>	49.00	<b>99.41</b>

Note. Coef. = standardized canonical function coefficient. *r<sub>s</sub>* = structure coefficients. *r<sub>s</sub><sup>2</sup>* (%) = squared structure coefficient. *h<sup>2</sup>* = communality coefficient (rounded). *r<sub>s</sub>* greater than |.45| and *h<sup>2</sup>* greater than 45% are in italics and bolded. *r<sub>s</sub>* greater than |.30| and *h<sup>2</sup>* greater than 30% are in italics.

Mediation Analyses

To test the mediating role of trust in the relation between attachment insecurities and PDs, we created composite scores based on CCA results. That is, in the child molester sample, one PD score was created averaging scores on the PDs that contributed to the first function (i.e., paranoid, schizoid, schizotypal, antisocial, avoidant, and dependent PDs). Another PD composite score was created averaging scores on the PDs that contributed to the second function (i.e., borderline, histrionic, obsessive-compulsive, dependent, and paranoid PDs). Finally, the first attachment composite was computed averaging scores on attachment avoidance and the reversed score of attachment security, whereas the second attachment score was simply represented by the anxious attachment scale. The same procedure was applied to compute composite scores in the control sample. Results of bootstrap analyses of the indirect effect of attachment on PDs through the mediating role of trust are listed in Table 5.

Results revealed that trust did mediate the association between attachment and PDs in the child molester sample, for both pairs of functions. Specifically, the composite score of the attachment avoidance function had a significant indirect effect on the composite score of the first PD function through the role of trust. The negative sign of the coefficient linking trust to attachment and PDs suggested that levels of mistrust explained a significant portion of the variance shared by attachment avoidance and

**Table 5.** Summary of Mediation Analysis for the Indirect Role of Attachment on Personality Disorders Through Levels of Trust in the Child Molester ( $n = 84$ ; 5,000 Bootstraps) and Control Samples ( $n = 80$ ; 5,000 Bootstraps).

Independent variables	Mediating variable	Dependent variable	Sample	Effect of IV on M	Effect of M on DV	Total effect	Direct effect	Indirect effect (bias corrected intervals)	Effect size
(IV)	(M)	(DV)		(a)	(b)	(c)	(c')	(a)(b) [95% CI]	$ab_{cs}$
Attachment Function 1	Trust	PDs Function 1	Child molesters	-.12***	-3.70***	1.85***	1.37***	.48 [0.13, 1.10]	.14
			Control	-.26***	-2.62***	1.76***	1.08***	.68 [0.22, 1.24]	.21
Attachment Function 2	Trust	PDs Function 2	Child molesters	-.09***	-3.27***	1.09***	.79*	.29 [0.02, 0.76]	.10
			Control	-.10	-4.39***	1.55***	1.13*	.42 [-0.08, 1.11]	.08

Note. Attachment Function 1: for the child molester sample, average score of attachment avoidance and the reverse score of attachment security; for the control sample, average of attachment avoidance, attachment anxiety, and the reverse score of attachment security. Attachment Function 2: for the child molester sample, score of attachment anxiety; for the control sample, average score of attachment anxiety and security. PDs Function 1: for the child molester sample, average score of paranoid, schizoid, schizotypal, antisocial, avoidant, and dependent PD; for the control sample, average score of all PDs. PDs Function 2: for the child molester sample, average score of borderline, histrionic, obsessive-compulsive, dependent, and paranoid PDs; for the control sample, average score of avoidant, dependent, borderline, histrionic, and obsessive-compulsive PDs.  $ab_{cs}$  = completely standardized indirect effect, measure of the effect size of the indirect effect (.01 = small effect size; .09 = medium effect size; .25 = large effect size; Preacher & Kelley, 2011). CI = confidence intervals; PD = personality disorder.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

PDs. The overall model explained approximately 38% of variance in the composite PD score,  $R^2 = .38$ ,  $F(2, 81) = 24.93$ ,  $p < .001$ . Likewise, the attachment anxiety function had a significant indirect effect on the composite score of the second PD function through the role of mistrust, in a model that explained roughly 21% of variance in PD scores,  $R^2 = .21$ ,  $F(2, 81) = 11.03$ ,  $p < .001$ . Of note, results remained unchanged when bootstrap analyses were repeated controlling for levels of pedophilic interest (i.e., SSPI score). In the control group, only the effect of the first attachment function on the first PD function was significantly explained by levels of mistrust, in a model that explained approximately 35% of variance in PD scores,  $R^2 = .35$ ,  $F(2, 77) = 20.43$ ,  $p < .001$ .

## Discussion

The present study examined the multivariate relations between attachment and PDs in child molesters, and investigated whether mistrust could mediate these relations. The study findings were largely in line with the hypothesis that two latent functions resembling attachment avoidance and anxiety had substantial associations with PDs, with distinct patterns for the dimensions of attachment avoidance and attachment anxiety. Further, results provided some preliminary evidence that feelings of mistrust may explain associations between attachment insecurities and PDs. In line with prior evidence, child molesters—compared with a matched community sample—reported significant elevations on all self-report PD scales, with the only exception of obsessive-compulsive PD, as well as greater levels of attachment insecurity and mistrust (Ahlmeyer et al., 2003; Bogaerts et al., 2004; Bogaerts, Declercq, et al., 2005; Bogaerts, Vanheule, et al., 2005; Craig et al., 2006; Marshall & Marshall, 2000; Miner et al., 2016; Sijtsema et al., 2014). Specifically, child molesters reported lower levels of attachment security and higher levels of attachment avoidance, suggesting that child molesters may suffer from substantial discomfort with close and intimate relationships. These findings provide support to the notion that an attachment framework may be useful to understand the mechanisms underlying sexual offending (Beech & Mitchell, 2009; Marshall, 1993; Marshall & Marshall, 2000; Mitchell & Beech, 2011; Ward et al., 1995).

Looking at associations between attachment styles and PDs, the present study provides support for earlier findings and offers new insights. At the bivariate level, results were largely consistent with a growing body of literature highlighting a substantial overlap between attachment styles and PDs. In both the child molester and control samples, all PDs were related with dimensions of attachment insecurity (i.e., low levels of attachment security, and high levels of attachment avoidance and anxiety). Furthermore, trust was positively related to attachment security, and negatively related to attachment anxiety, avoidance, and all PDs. Overall, this pattern of findings pointed to a general overlap between dimensions of attachment, trust, and PD traits across samples. These results are in line with Fonagy and collaborators (Fonagy & Allison, 2014; Fonagy et al., 2015). At the bivariate level, different attachment style had poor discriminatory power in their associations with PD. At the same time, the appropriateness of adopting a multivariate approach such as CCA was supported by the high

degree of overlap within each set of variables (i.e., attachment and PD scales), which is often found in attachment and PD research and replicated in the present study.

Results of CCA provided some new evidence regarding the complex net of associations between attachment styles and PDs. In line with prior studies, we found that among relatively well-adjusted individuals (i.e., community sample), multivariate analyses also yield generic associations between attachment insecurity and PDs with limited discriminant validity (Brennan & Shaver, 1998; Sherry et al., 2007). However, in samples that are likely to manifest greater variability and greater levels of pathological personality traits, the picture is far more interesting (Fossati et al., 2003). Specifically, our study confirmed and extended prior knowledge (Brennan & Shaver, 1998; Fossati et al., 2003; Sherry et al., 2007), indicating that, also among child molesters, *constellations* of PDs can be understood in terms of different attachment dimensions. Replicating Fossati et al.'s (2003) findings, two latent dimensions resembling attachment avoidance and attachment anxiety were able to explain a substantial amount of variance in PDs. Specifically, the first canonical function revealed that an attachment dimensions defined by high levels of attachment avoidance was able to explain almost half of the variance in PD traits in the child molester sample. Replicating and extending Fossati et al.'s (2003) findings, our findings showed that the attachment avoidance dimension was specifically related to schizoid, schizotypal, avoidant, and antisocial PD. These PDs may therefore share an internal representation of others as unreliable, which could lead to social withdrawn or antagonistic attitudes. Such a negative view may lead to consider others as hypercritical and judgmental (e.g., in avoidant PD) or as hostile and malevolent (e.g., antisocial PD). Furthermore, patients with schizoid and schizotypal PDs often manifest a pathological restriction in the range of relational and emotional experiences, in line with an avoidant attachment style. In contrast with prior studies (Brennan & Shaver, 1998; Fossati et al., 2003), we also found some support for the possibility that antisocial PD could be underlain by attachment disturbances (McGauley et al., 2011; Yakeley & Williams, 2014). This finding is consistent with Beeney et al.'s (2015) study, and seems to indicate that meaningful associations between attachment insecurity (and attachment avoidance in particular) and antisocial PD could be obscured in a population that typically report low levels of antisocial PD traits (e.g., college or community samples).

Regarding the attachment anxiety dimension, we replicated and extended Fossati et al.'s (2003) findings obtained in a mixed psychiatric sample. Also among child molesters, borderline, histrionic, and (to a lesser extent) obsessive-compulsive PD shared a substantial amount of variance with attachment anxiety. These PDs may therefore be associated with high sensitivity to and low tolerance for rejection in interpersonal contexts. According to the attachment framework proposed above, these PDs may also be characterized by a positive internal representation in which others are seen as available and even necessary for the self, but unpredictable in their responses. That is, child molesters with borderline, histrionic, and obsessive-compulsive PD traits (or a combination of them) may desperately long for intimate relationships, react dramatically to threat of separation from significant others, and do not tolerate being alone. Finally, dependent and paranoid PD showed substantial associations with both

attachment avoidance and anxiety dimensions. These findings could indicate that child molesters with dependent and paranoid PD traits may present a combination of avoidant and anxious characteristics, such as a negative internal representation of the self and of others, also referred to as fearful attachment style (e.g., Bartholomew & Horowitz, 1991; Brennan & Shaver, 1998; Ren et al., 2017). Another possible explanation is that child molesters with dependent and paranoid PD traits do not represent a homogeneous group, but rather belong to different subgroups. From this perspective, it could be possible that a subgroup of child molesters with dependent and/or paranoid PD traits is characterized by an avoidant attachment style, while a different subgroup is characterized by an anxious attachment style. Consistent with Fossati et al.'s (2003) findings, low levels of attachment security contributed to the avoidant attachment dimensions, but did not contribute to the anxious attachment dimension, indicating that child molesters with an anxious attachment style may be characterized by less severe disturbances in attachment, compared with those with an avoidant attachment style. For instance, child molesters with an anxious attachment style may still be able to establish mature intimate relationship when they find a secure base and a safe haven in significant others (e.g., a clinician).

This pattern of results can also be interpreted in light of the recently proposed trait model of PDs (APA, 2013), which describes PDs in terms of maladaptive variants of general personality traits organized in five broad maladaptive personality domains: negative affectivity, detachment, antagonism, disinhibition, and psychoticism. From this perspective, results of the present study may indicate that avoidant attachment style is related to maladaptive personality traits in the domains of detachment (e.g., withdrawal, anhedonia, suspiciousness, avoidance of intimacy), antagonism (e.g., deceitfulness and manipulativeness), and to a lesser extent disinhibition (e.g., impulsivity and irresponsibility) and negative affectivity (e.g., restricted affectivity and hostility). Indeed, these traits are characteristics of the PDs associated with the attachment avoidance function in the present study. Conversely, adopting this dimensional framework, anxious attachment may be mostly related to maladaptive personality traits in the disinhibition and negative affectivity domains. Although these associations may not be drawn from the present data with reasonable certainty, these supposed associations between attachment styles and maladaptive personality trait domains are strikingly consistent with recent studies examining the newly proposed alternative model of PDs from an attachment perspective (e.g., Fossati et al., 2015).

To our knowledge, this is the first study to empirically examine the possible mediating role of mistrust in the relation between attachment and PDs. Interestingly, we found some preliminary support for Fonagy et al.'s (2015; see also Fonagy & Allison, 2014) hypothesis that the association between attachment insecurities and PDs can be (at least partially) explained by feelings of mistrust. This result was replicated across samples (though more consistently among child molesters) and involved relations between PDs and both avoidant and anxious attachment. In line with Fonagy's theory, it might be speculated that the effect of attachment disturbances on PDs may follow different pathways. One such pathway may involve the inability to develop feelings of trust about the self and others. This difficulty can assume different forms, spanning

from a chronic mistrust toward others to the incapacity to understand who is trustworthy and who is not, resulting in the risk of being maltreated by people mistakenly considered as trustworthy (Fonagy & Allison, 2014; Fonagy et al., 2015; Ward & Siegert, 2002). The basic incapacity to rely on a mature personal judgment about self–others interactions may ultimately contribute to maladaptive personality traits, underlain by a lack of resilience and coping skills, which are typically acquired and developed in the context of significant interpersonal relationships (Fonagy & Allison, 2014; Fonagy et al., 2015). Notably, all findings were unaltered when controlling for levels of pedophilic interest, suggesting that this variable—although of great relevance for other means (e.g., risk assessment)—may not have an impact on the relation between attachment insecurity, trust, and PDs.

It should be emphasized that—due to the cross-sectional design of the study—it cannot be inferred with certainty that attachment actually precedes trust, and that mistrust stems from attachment problems. In general, it is plausible that individual differences in levels of trust depend on a variety of factors. Specifically, in justice-involved populations such as child molesters, increases in preexisting feelings of mistrust or the generation of additional forms of mistrust can derive from the burden of the stigma associated with child molestation, as well as from interactions with the criminal justice system (Stinson & Becker, 2013). This possibility is consistent with the fact that the correlations between attachment and trust were relatively stronger in the control sample, compared with the child molester samples, suggesting that among child molesters other factors may play a more important role in explaining levels of trust. Therefore, future studies are warranted to understand the different mechanisms that contribute to the generation and maintenance of feelings of mistrust in child molesters. Nonetheless, the present findings appear to suggest that mistrust could represent a feature shared by attachment disturbances and PD traits, and likely explain their association, among child molesters.

The present findings have important conceptual and clinical implications, and provide tentative support for examining the relevance of attachment and trust to inform treatments for child molesters with PDs. Conceptually, the current study highlight the added value of examining associations between attachment and PDs looking at *constellations* of PD traits, rather than focusing on PD in isolation (Brennan & Shaver, 1998; Fossati et al., 2003; Sherry et al., 2007). From this perspective, our findings suggest that child molesters with a *constellation* of avoidant, schizoid, schizotypal, and antisocial PD traits may be conceptualized in terms of a shared pattern of attachment avoidance. This is notable as certain child molesters may present traits of these PDs without reaching the diagnostic threshold for a formal diagnosis, but still manifesting a maladaptive personality profile that has its roots in an avoidant attachment style. Moreover, child molesters with a *constellation* of borderline, histrionic, and obsessive-compulsive PD traits may share a pattern of attachment anxiety. This pattern of findings suggests that, regardless the presence or absence of specific PD diagnoses, child molesters with traits belonging to these three PDs may present a different challenge for clinicians, compared with those described above (i.e., those with PD traits related to attachment avoidance). Finally, results of the present study suggest that child molesters with paranoid and



dependent PD traits may present with either avoidant or anxious attachment styles, or a combination of both, and interventions for child molesters with prominent paranoid and dependent features should be tailored on the specific case.

Overall, these findings indicate that child molesters with different *constellations* of PD traits may benefit from different treatment approaches and that certain therapeutic styles can be more effective with some child molesters but not with others. As such, a thorough assessment of PDs and attachment at intake represents a crucial step that—if disregarded—may lead to investing in ineffective therapeutic interventions. Finally, our mediation findings provide some preliminary evidence that future research on treatment process could include a focus on the role of trust as a potential mechanism of change. In line with Fonagy's theory and its clinical implications (e.g., Fonagy & Allison, 2014; Fonagy et al., 2015), our results suggest that it is not a modification in attachment style *per se* that contributes to a change in personality functioning. Rather, one of the possible mechanisms linking changes in attachment styles and changes in personality functioning is the capacity to perceive others as trustworthy and rely on them to acquire emotional and cognitive skills by which to navigate the social world (Fonagy et al., 2015). As our findings generalized across the two attachment dimensions, it is likely that mechanisms involving feelings of trust are not limited to specific attachment patterns or specific PDs, but are able to explain associations between attachment disturbances and PDs more generally. Notably, recently developed treatments for sex offenders already include an emphasis on trust as a crucial treatment target (e.g., Safe Offender Strategies model; Stinson & Becker, 2013). In this treatment approach, the goals of increasing offenders' levels of trust and allowing offenders to extend their capacity to trust in their social environment in everyday life is pursued with multiple techniques in both individual and group therapy sessions. In line with the emphasis of the present study, the focus of this treatment program is to increase levels of trust across a wide range of relationships, including but not limited to attachment relationships with parents and other family members (Stinson & Becker, 2013).

### Limitations

The present findings should be considered in light of the study limitations. First, although the sample ensured adequate statistical power, replications in larger and diverse samples are needed to corroborate our results. Second, we only relied on self-report measures. As such, common method variance could have spuriously inflated correlations among study variables. Further, ratings of PDs and attachment obtained with clinician-rated and interview-based instruments are typically only modestly related to self-report scales, suggesting that they may map onto slightly different constructs. Relatedly, the absence of a clinical measure of PDs did not allow us to estimate the prevalence of PD diagnoses in the two samples. Third, as a measure specifically designed to assess the concept of trust as operationalized in Fonagy's theory (Fonagy & Allison, 2014; Fonagy et al., 2015) is not yet available, we used a general measure of trust. Therefore, these results provide only indirect support to Fonagy's theory. Fourth, we did not differentiate between intra- and extrafamilial child molesters.

Although this choice was justified by nonsignificant differences between the two subgroups on key variables, and although follow-up analyses revealed that the main findings were not qualified by group membership (i.e., intra- or extrafamilial child molesters), future studies with larger samples are needed to clarify possible differences between these two subgroups (e.g., Bogaerts, Declercq, et al., 2005). An additional limitation of the study can be represented by the absence of another comparison group characterized by a different kind of sex offenders (e.g., rapists), preventing us to understand which characteristics are unique of child molesters. Finally, considering the cross-sectional design of our study, results of mediation analyses should be interpreted with caution. As all instances of a-temporal mediation (i.e., where all variables are assessed at the same time-point; Winer et al., 2016), our indirect effect results revealed that a significant portion of the variance shared between attachment and PDs was explained by levels of trust, without additional information about the temporal or causal ordering of the variables in the models.

## Conclusions

The present study adds to the extant knowledge supporting that an attachment framework is one of the possible lens to understand and treat PDs. Yet, a challenge for future research is to integrate different frameworks and compare their explanatory power for the understanding and treatment of PDs in child molesters. Of note, rather than being mutually exclusive, some of the existing alternative framework could be considered as complementary to the attachment conceptualization proposed here, such as clinical models emphasizing the role of cognitive distortions (e.g., Buschman & van Beek, 2003). Notwithstanding its limitations, the present study presents some novel insight on the complex interplay of attachment styles and PDs among child molesters. Future studies should focus on the role of trust in the association between attachment disturbances and PDs, further investigating whether it can represent a possible developmental precursor of PDs and a useful treatment focus in child molesters.

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## Notes

1. Some evidence suggests also that disorganized attachment is among the strongest predictors of psychopathology and borderline personality disorder (PD) in particular (e.g., Beeney et al., 2017). However, the construct of disorganized attachment was not included in our study and it is therefore not discussed in our review of prior findings.

2. This age cut-off is different from the one used in the Screening Scale for Pedophilic Interests (see below). In selecting participants, we have adopted the cut-off of victims of 16 years of age or below in keeping with the Belgian legislation to define pedophilic acts.
3. Because the differences between intra- and extrafamilial child molesters may be particularly relevant from an attachment perspective (e.g., Bogaerts, Declercq, et al., 2005), we have repeated the analyses controlling for group membership (dummy-coded), and results were virtually unchanged. Of note, multivariate analyses of variance revealed nonsignificant differences between intra- and extrafamilial child molesters on PDs and attachment variables.
4. The correlations linking trust and attachment ranged in magnitude between  $|.30|$  and  $|.54|$  across the two samples. In line with the conceptual arguments presented in the introduction, the fact that trust and attachment variables shared a portion of variance comprised between 9% and 29% seems to indicate that, although trust can be seen as a component of attachment security, the two constructs can be measured separately.

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